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Agriculture Is Fun

Technology Trivia I

Each year, dozens of new and improved products and technologies emerge from the laboratories of the Agricultural Research Service. Here are just a few examples illustrating that solving the mysteries behind Agriculture is Fun.

- ▶ Maysin is a compound that gives corn a natural resistance to harmful insects like the earworm.
- ▶ ARS scientists in Columbia, Missouri and Tifton, Georgia plan to manipulate a genetic pathway in corn silk to boost production of Maysin.
- ▶ Tifton scientists found maysin in a primitive race of corn from Mexico. (ARS Plant Genetics Research Unit, University of Missouri - Columbia).
- ▶ Deet is a strong insect repellent that was discovered by ARS scientists 40 years ago.
- ▶ Kenaf has been researched at ARS as a possible alternative

to wood pulp for papermaking since 1956.

- ▶ ARS researchers developed treatments for cotton textiles that resist bacteria and the fungi that causes athlete's foot.
- ▶ Mites that feed on chicken blood cost the egg producers \$80 million in lost revenue. ARS researchers discovered that extracts from peppermint and other plants deter the pests, the northern fowl mites, from feeding.
- ▶ ARS scientists invented a pesticide that sticks to a plant's leaves. They used cornstarch to encapsulate the pesticide.
- ▶ What do soybean and rice hulls, rice bran and sugar beet pulp have in common? They are inexpensive byproducts that bind to metals and other industrial wastes. They can be used to clean wastewater.
- ▶ In the 1970's a team of ARS biochemists attached a synthetic polymer to starch molecules and discovered "Super Slurper." New products developed out of this discovery include seed coatings, bandages, fuel filters, disposable diapers, and "packing peanuts."
- ▶ A company in Pennsylvania worked with ARS scientists to develop a biofungicide from the yeast *Candida oliophila*. The yeast, isolated from tomato peel, is a natural enemy of fungi that cause citrus and other fruits to rot during storage. (ARS - Appalachian Fruit Research Lab., Kearneysville, West VA.)

- ▶ Neem oil covers a plant's leaves like a raincoat stopping fungi that causes diseases like powdery mildew and rust from infecting plants. ARS plant pathologists discovered that neem oil is the first botanical product to exhibit fungicidal properties. They want to discover how the neem oil protects the plant from infection. (ARS Floral & Nursery Plants Res. Unit, National Arboretum.)
- ▶ An enzyme from soybean hulls is now replacing formaldehyde in adhesives, abrasives, protective coatings and other products. ARS scientists were first to purify the enzyme, a soybean peroxidase. (ARS, National Center for Agricultural Utilization Research, Peoria, Illinois).
- ▶ Fiber from chicken feathers may be used in disposable diapers, and household "wipes", thanks to a separation process developed by ARS scientists in Beltsville, MD.
- ▶ ARS scientists in Kimberly, Idaho, opened the door to use PAM (short for polyacrylamide) to anchor as much as 1,000 pounds of topsoil that might otherwise be swept away by irrigation water.
- ▶ Because of their efforts, more than 50,000 acres of farmland was treated with PAM. That prevented some 1 million tons of topsoil from eroding in a single year.
- ▶ Another spin-off was a software program called WASHOUT that quickly estimated the amount of sediment in irrigation run-off.
- ▶ PAM use led to the manufacture of

<p>equipment designed especially for adding precise amounts of PAM to water at the top (or head) of the irrigation furrow.</p> <ul style="list-style-type: none"> Find out more about PAM on the World Wide Web at: http://kimberly.ars.usda.gov/pampage.html (ARS/Northwest Irrigation and Soils Research Lab.). ARS scientists are studying uses for a water-soluble gum in lesquerella seeds. Lesquerella is a desert shrub that grows in the dry southwest. The gums may be used in health and beauty products, plasticizers, lubricants, coatings and thickening agents for foods and for crude oil recovery. (ARS New Crops Research Unit, National Center for Agricultural Utilization Research - Peoria.) Inexpensive fiberboard bee traps and chemical lures developed by an ARS scientist are being used commercially to capture honey bee 	<p>swarms that might otherwise build their hives close to homes, schools, playgrounds and parks.</p> <ul style="list-style-type: none"> The traps were developed originally as an advance warning and monitor for the movements of the defensive Africanized strain of honey bees. Scientists monitor the traps and when the Africanized honey bee swarm has set up housekeeping in the trap, the scientist covers the entrance and removes both the swarm and the trap. (ARS Carl Hayden Bee Research Lab., Tucson, Texas). Wheat-based concrete could be used for roofing tiles, insulation, flooring or soundproofing. It could replace gypsum board used for shower stalls or to make insulated patios and sidewalks. ARS scientists in Albany, California developed a tough, rubbery aquagel aggregate from wheat starch. It is composed of about 25 % starch and 75 % water. (ARS Cereal Product Utilization Research Unit, Western Regional Research Center, Albany, CA.) A bacterium found in water from a pond on a hog farm in Illinois is used to develop a process to convert oleic acid found in soybeans, corn, sunflower and safflower oils to a compound called 7,10-dihydroxy-8-(E)-octadecenoic acid. This process offers a better way to convert vegetable oils to compounds that can be used in plasticizers, lubricants and paints or in the preparation of new antibiotics. (ARS Oil Chemical Research Unit, National Center for Agricultural Utilization Research, Peoria, Illinois).
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